

**POTENTIAL CANCER CHEMOPREVENTIVE AGENTS FROM *PONGAMIA*  
*PINNATA* AND *ARBUTUS UNEDO***

**BY**

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## LIST OF ABBREVIATIONS

$[\alpha]_D$	specific optical rotation at the sodium D line
$c$	concentration
calcd	calculated
CD	circular dichroism (spectroscopy)
CD	concentration required to double the specific activity (quinone reductase induction assay)
$\text{CHCl}_3$	chloroform
$\text{cm}^{-1}$	reciprocal centimeters
$^{13}\text{C}$ NMR	carbon-13 nuclear magnetic resonance
COSY	homonuclear correlation spectroscopy
1D, 2D	one- or two-dimensional
$\delta$ (ppm)	chemical shift in parts per million
$\delta_C$	carbon-13 chemical shift
$\delta_H$	proton chemical shift
DEPT	distorsionless enhancement by polarization transfer
DMSO	dimethyl sulfoxide
$\epsilon$	molar absorptivity
EIMS	electron-impact mass spectrometry or spectrum
EtOAc	ethyl acetate
EtOH	ethanol
FABMS	fast-atom bombardment mass spectrometry (spectrum)
g	gram

## LIST OF ABBREVIATIONS (Continued)

h	hour
HMBC	heteronuclear multiple-bond connectivity spectroscopy
HMQC	heteronuclear multiple-bond quantum coherence spectroscopy
$^1\text{H NMR}$	proton nuclear magnetic resonance
HPLC	high-performance liquid chromatography
HR	high resolution
Hz	Hertz
$\text{IC}_{50}$	concentration that inhibits a response by 50% relative to a negative control
IR	infrared absorption
$J$	coupling constant
L	liter (s)
$\lambda$ (nm)	wavelength in nanometers
M	molar concentration
$[\text{M}]^+$	molecular ion
max	maximum
MeOH	methanol
min	minutes
mg	milligram
$\mu\text{g/mL}$	microgram per milliliter
MHz	megahertz
mL	milliliter (s)
MS	mass spectrometry or spectrum

## LIST OF ABBREVIATIONS (Continued)

<i>m/z</i>	mass-to-charge ratio
<i>v</i>	infrared absorption frequency
NaCl	sodium chloride
NOESY	nuclear Overhauser enhancement correlation spectroscopy
ORD	optical rotatory dispersion
ppm	parts per million
QR	quinone reductase
<i>R<sub>f</sub></i>	migration distance relative to solvent front in thin-layer chromatography
ROESY	rotating frame nuclear Overhauser enhancement spectroscopy
Si	silica
TLC	thin-layer chromatography
<i>t<sub>R</sub></i>	retention time
UV	ultraviolet absorption
<i>v</i>	volume
<i>w</i>	weight

## SUMMARY

This dissertation project was initiated as part of an investigation directed toward the discovery of new cancer chemopreventive agents from plants, and two species were chosen for detailed study. The petroleum ether and ethyl acetate-soluble extracts of the stem bark of *Pongamia pinnata* (L.) Pierre (Leguminosae), collected in West Irian (Irian Jaya), Indonesia, showed significant inducing activity in the quinone reductase assay (CD <2.5 µg/mL and <3.5 µg/mL, respectively). Bioassay-guided fractionation of these extracts using cultured Hepa 1c1c7 mouse hepatoma cells in a quinone reductase induction assay led to the isolation of four new flavanone derivatives [(2*S*)-5,7-dimethoxy-8-(2*S*-hydroxy-3-methyl-3-butenyl)-3',4'-methylenedioxyflavanone, (2*S*)-5,7-dimethoxy-8-(2*S*-hydroxy-3-methyl-3-butenyl)-flavanone, (2*S*)-5,7-dimethoxy-8-(2*R*-hydroxy-3-methyl-3-butenyl)-flavanone, and (2*S*)-5,7-dimethoxy-8-formyl-flavanone], one new flavone [5-methoxy-3'',4''-diacetoxy-(3'',4''-dihydro)-2'',2''-dimethylpyrano-(7,8:5'',6'')-flavone], and one new chalcone [(7-*O*-methylpraecansone B)] together with 13 known compounds of the alcohol [(1-hexacosanol), fatty acid [(octadecanoic acid)], flavonoid [candidin, candidone, 3'-methoxypongapin, 5-methoxy-3',4'-methylenedioxy-2'',2''-dimethylpyrano-(7,8:5'',6'')-flavone, pongapinone A, pongapinone B, and praecansone B], sterol [(stigmasterol 3-*O*-β-D-glucopyranoside)], and terpenoid [(betulinic acid, α-cadinol, lupenone, and lupeol)] types. Three of the new compounds [(2*S*)-5,7-dimethoxy-8-formyl-flavanone, (2*S*)-5,7-dimethoxy-8-(2*S*-hydroxy-3-methyl-3-butenyl)-flavanone, and 7-*O*-methylpraecansone B], and seven of the known compounds [candidin, candidone, 3'-methoxypongapin, 5-methoxy-3',4'-methylenedioxy-2'',2''-dimethylpyrano-(7,8:5'',6'')-flavone, pongapinone A, pongapinone B, and praecansone B] exhibited induction activity in the quinone reductase assay, while the other nine isolates